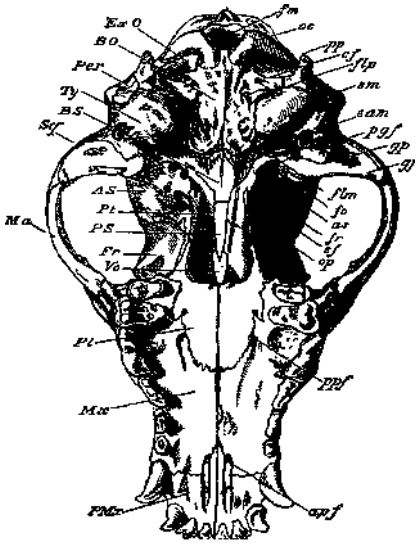

FIG. 16.—Under surface of the cranium of a Dog.

a/pf, Anterior palatine foramen ; *as,* posterior opening of alisphenoid canal; *AS,* alisphenoid ; *BO,* basioccipital ; j8>S, basisphenoid; *cf,* condylar foramen,; *earn,* external auditory meatus ; *JSss.O,* exoccipital ; *Jim,* foramen "lacerurn. medium ; *jft/p*$_t$ foramen lacerum postering; *fin>,* foramen magnum; *fa,* foramen ovale ; *fr,* foramen rotundum ; JFV, frontal ; *gf,* glenoid fossa ; *g$>,* postglenoid process ; *Ma,* malar ; *Msc*$_y$ maxilla ; *oc,* occipital condyle ; *op*$_y$ optic foramen ; *Per,* mastoid portion of periotic ; *pgf,* postglenoid fossa ; *JPl,* palatine ; PJtfa:, premaxilla ; *ftp,* paroccipital process ; *ppf,* posterior palatine foramen ; *PS*$_t$ presphcnoid ; *Pt,* pterygoid ; *#f,* Kphenoidal fissure or foramen lacerum aiiterius ; *sm,* stylomastoid foramen ; /SO, supraoccipitai j *Sg,* zygornatic process of squamosal ; *Ty*$_t$ tympanic bulla; Fa, vomer. (From Flower's *Osteology.)*

In connexion with the elaboration of the chain of auditory ossicles it is very usual for mammals to possess a thin inflated bone, sometimes partly or entirely formed out of the tympanic bone, and known as the tympanic bulla. Whether this structure is thin and inflated or thick and depressed in form it is characteristic of the mammals, and does not occur below them in the series. But it is not present in all mammals. It is absent, for example, in the Monotremes. When it is present it is sometimes formed from other bones, as, for instance, from the alisphenoids. The tympanic ring has been held to be the equivalent of the quadrate. It is more probably the quadratojugal.[1]

Ribs. — All mammals are furnished with ribs, of which, the number of pairs differs considerably from group to group, or it may be even from species to species. Each rib, with the exception of the first pair, consists of two parts, a dorsal and a ventral, which are usually ossified and connected by cartilage. The dorsal part articulates with the vertebral column by means of a head and a tuberculum, the former articulating with the centrum of the vertebra, the latter, in most cases, with the transverse process of the vertebra. The ventral part, or costal cartilage, articulates with the sternum. The head of the rib articulates with the centrum of the vertebra in front of that with which the tuberculum articulates, and the tuberculum, when present, springs from the transverse process. Only in the Monotremes

[1] Gegenbaur, *Vergl. Anat.* ***Wvrbetth.*** Leipzig, 1898, p. 404.